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THREE NEW RODENTS FROM SOUTHERN UTAH.

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Field work in southern Utah during the last three years has revealed the presence of three previously unrecognized rodents of the genera *Tamiasciurus* and *Dipodomys*. Descriptions for these races are provided below. The capitalized color terms in this paper are after those used by Ridgway, Color Standards and Color Nomenclature, 1912. The type specimens have been placed in the Museum of Zoology of the University of Utah and some paratypes in the Museum of Zoology of the University of Michigan.

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***Tamiasciurus fremonti dixiensis*, new subspecies.**

DIXIE CHICKAREE.

Type.—Male, adult, skin with skull; Museum of Zoology, University of Utah, no. 4,374; about 9,500 feet, near Further Water, Dixie National Forest, Pine Valley Mountains, Washington County, Utah; August 23, 1941; collected by Orlo Hall and Ross Hardy; original no. 2,223.

Distribution.—Known from the spruce belt of the Pine Valley Mountains, the Markagunt Plateau and the Beaver Mountains (also known as Tushar Mountains) of southwestern Utah.

Diagnostic characters.—Size large for the species; dark, with much black and comparatively little yellow in either summer or winter pelage; hind foot, nasals, and maxillary tooth row long.

Measurements (in mm.): Type: total length, 339; tail vertebrae, 131;

hind foot, 53; ear from notch, 28. Skull: basal length, 44.0; palatilar length, 22.4; zygomatic breadth, 27.2; cranial breadth, 20.6; interorbital breadth, 15.5; breadth at postorbital constriction, 14.7; nasal length, 16.0; maxillary tooth row, 8.4; diastema, 11.9; width of palate between second and third molars, 6.5; length of line of union of maxilla and premaxilla on the dorsal surface, 3.1

In this form, the hind foot, six males, 53.3 (52-55), and other body measurements are about the same as in *mogollonensis*, three males, 54 (53-55), thus averaging larger than in *fremonti*, three males, 49.9 (47-52). The palatilar length of four specimens, 22.5 (21.4-23.2), is less than in three *mogollonensis*, 23.6 (23.5-23.7), averaging about the same as in three *fremonti*, 22.7 (22.3-23.2). The nasals, 16.3 (16.0-16.7), average longer than in *mogollonensis*, 15.2 (15.0-15.4), or *frenonti*, 15.6 (15.0-16.6); also the maxillary tooth row, 8.4 (8.3-8.4), averages longer than in *mogollonensis*, 8.1 (8.0-8.3), or in *fremonti*, 8.0 (7.8-8.5). The length of the line of union of the maxilla and premaxilla on the dorsal surface of the skull averages longer in this form: 3.2 (3.0-3.3); *mogollonensis*, 2.9 (2.6-3.3); *fremonti*, 2.5 (2.0-3.3).

Two female topotypes of *dixiensis* measured: hind foot, 50.5 (49-52); palatilar length, 22.0 (21.3-22.7); nasal length, 16.1 (15.5-16.6); maxillary tooth row, 8.25 (8.2-8.3); line of union of maxilla and premaxilla on dorsal surface, 3.2 (2.8-3.6).

In addition to the above, the average and extreme measurements of topotypes are: Skin, 6 males and 1 female, respectively: total length, 335.6 (298-340), 330.0; tail vertebrae, 130.0 (117-138), 130.0; ear from notch, 26.3 (22-28), 27. Skull, 4 males and 2 females, respectively: basal length, 43.9 (43.3-44.3), 43.1 (42.9-43.3); zygomatic breadth, 27.3 (27.0-27.8), 26.95 (26.9-27.0); greatest breadth of cranium, 20.7 (20.6-21.0), 20.6 (20.3-20.9); interorbital breadth, 15.8 (15.5-16.0), 15.2 (15.0-15.4); postorbital breadth, 15.3 (14.7-15.5), 14.75 (14.7-14.8); diastema, 12.3 (11.9-12.7), 12.3 (12.2-12.4); width of palate between second and third molars, 6.7 (6.5-6.9), 6.75 (6.7-6.8).

Comparisons of pelages.—From Colorado specimens of *T. f. fremonti*, in comparable summer pelage, this form differs in being much more blackish except on the dorsal surface of the legs and feet. This appearance is caused by the narrower and paler yellowish band and the wider black band on each hair as shown by microscopic examination. The light band is near Isabella Color instead of Ochraceous-Tawny. The top of the head is much more nearly black. The subterminal band on the lateral and end hairs of the tail has more deep black and less brownish-black than in *fremonti*.

From San Francisco Mountain, Arizona, summer pelage specimens of *mogollonensis*, this form differs even more than from typical *fremonti*. *Dixiensis* is darker, for the Cinnamon-Rufous band is replaced by a narrower band of Isabella Color, thus leaving the larger amount of black to dominate the pelage tone.

In winter pelage, *dixiensis* differs from both adjoining races in the

replacement of the yellowish bands by gray, thus producing a grizzled appearance more pronounced than in either of the other races.

Remarks.—Specimens from the Markagunt Plateau and the Beaver Mountains are not typical, but tend towards *fremonti* in a few size and color characteristics. Inasmuch as adults are closer to *dixiensis*, they are placed with this race. One male from 6,500 feet, at Vermillion Castle Forest Campground, Dixie National Forest, Iron County, is much more nearly typical *dixiensis* than are other specimens from the Markagunt Plateau. The Beaver Mountains population, as would be expected from its geographic position, grades toward *fremonti* more than do the other populations.

Typical *dixiensis* in the Pine Valley Mountains seems to be much more shy than usual for this species. Instead of chattering and scolding the human intruder as the chickaree commonly does in other parts of Utah, these squirrels hide and remain quiet upon one's approach, making collection rather difficult. Many piles of spruce cone chips suggest a fairly good population in the Pine Valley range.

Specimens examined.—UTAH. Total number: 24, as follows: *Washington Co.*:—from an altitude of over 9,500 feet, near Further Water, Dixie National Forest, Pine Valley Mountains, 8. *Iron Co.*: Parowan Canyon, Vermillion Castle Forest Campground, Dixie National Forest, 6,500 feet, 1. *Kane Co.*: near Navajo Lake, Dixie National Forest, about 10,000 feet, 7; near Duck Creek Forest Campground, Dixie National Forest, about 9,500 feet, 2. *Beaver Co.*: near Puffer Lake, Fishlake National Forest, about 10,500 feet, 6.

***Dipodomys microps woodburyi*, new subspecies.**

WOODBURY KANGAROO-RAT.

Type.—Male, adult, skin with skull; Museum of Zoology, University of Utah, no. 4,376; about 3,500 feet, in *Clistoyucca* area on Beaverdam Slope west of Beaverdam Mountains, Washington County, Utah; altitude 3,300 feet; October 19, 1940; collected by Ross Hardy; original no. 2,169.

Distribution.—Known only from the west slope of the Beaverdam Mountains in Washington County, Utah.

Diagnostic characters.—Size large for the species, being close to *celsus* in this respect; tail long; a light-colored form with paler and less extensive dark markings than the nearby dark-colored races of southern Utah.

Measurements (in mm.)—Type: total length, 302; tail vertebrae, 177; hind foot, 43; ear from notch, 14. Skull: basal length, 27.5; length of nasals, 13.4; greatest breadth, 24.3; maxillary breadth, 19.4; interorbital breadth, 12.5; maxillary tooth row, 4.9.

Average and extreme measurements of 5 male and 3 female topotypes are, respectively: total length, 289.4 (278–302), 286.5 (284–289); tail vertebrae, 169.0 (164–177), 169.0 (167–171); hind foot, 44.0 (43–46), 43.6 (41–45); ear from notch, 14.8 (14–17), 14.7 (14–15). Skull: basal length, 27.6 (26.9–28.9), 27.8 (26.9–28.4); length of nasals, 13.8 (13.3–14.4), 13.1 (12.7–13.5); greatest breadth, 24.2 (23.5–25.4), 24.1 (23.6–25.0);

maxillary breadth, 20.1 (19.4–21.3), 20.7 (20.0–21.5); interorbital breadth, 12.3 (11.6–12.6), 12.4 (12.0–12.8); maxillary tooth row, 5.0 (4.8–5.5), 4.9 (4.6–5.2).

Description of pelage.—Color of type: Upperparts Fawn and Buffy Brown mixed with blackish. The Dark Gull Gray base of the hair on the upperparts has a terminal (on some hairs, subterminal) band of Light Vinaceous-Cinnamon, this latter color being clearer on the sides. Some hairs are black tipped. Underparts, hip stripe, lateral tail stripes, small supra-ocular spots, postauricular spots, fore limbs and dorsal surface of hind feet, and tail at extreme base all around, pure white.

Comparisons: *D. m. woodburyi* differs from *celsus* in lighter coloration, the underfur being Dark Gull Gray instead of Deep Neutral Gray; brownish-gray instead of black dorsal and ventral tail stripes, soles of hind feet, and dark hairs on the ears; and longer average tail. The skulls of the two races are much the same although that of *woodburyi* is slightly smaller throughout. The upperparts of immature individuals, immediately before receiving the first adult pelage, present a general tone of Pale Mouse Gray instead of Deep Mouse Gray as in *celsus*. Differs from *leucotis* chiefly in lighter coloration and slightly larger size, being midway between *celsus* and *leucotis* in skull and external measurements. The length of the hind foot of *woodburyi* averages greater than in *leucotis*.

D. m. woodburyi is similar to *bonnevillei* in color but differs in larger size, longer tail, longer nasals, and narrower tips of upper incisors. Differs from *centralis* in larger size, longer hind foot, larger skull with longer nasals, and slightly lighter coloration. Some specimens of *centralis* from Penoyer Valley, Lincoln County, Nevada, approach *woodburyi* in color, but most specimens of *centralis* are darker. From *occidentalis*, *woodburyi* differs in larger size, longer hind foot, larger skull, and longer nasals. The two races are similar in color.

Remarks.—Most likely the Beaverdam Mountains have served to isolate the race *woodburyi* on the light-colored soils to the west and prevent mixing with the dark-colored animals on the red and black soils to the east. These mountains have served to prevent the spread of the Joshua tree (*Clis-toyucca brevifolia*), and the desert tortoise (*Gopherus agassizi*) both of which are found on the west, but not on the east side, although they easily survive when moved over the range. Also, this mountain range separates *Neotoma l. lepida* on the west from *N. l. monstrabilis* on the east.

For many reasons, not the least of which is his extensive work on the biology of southern Utah, it is a pleasure to name this race for Prof. A. M. Woodbury of the Zoology Department of the University of Utah.

Specimens examined.—14, all from the type locality.

***Dipodomys ordii panguitchensis*, new subspecies.**

PANGUITCH KANGAROO-RAT.

Type.—Male, adult, skin with skull; Museum of Zoology, University of Utah, no. 4,375; one mile south of Panguitch, Garfield County, Utah; altitude 6,666 feet; August 31, 1940; collected by Ross Hardy; original no. 2,151.

Distribution.—Known only from the sagebrush and lava areas near Panguitch, Garfield County, Utah.

Diagnostic characters.—A race closely allied to *Dipodomys ordii columbianus* but slightly larger in size and with skull somewhat wider in proportion to length. This form can be most readily separated from other races of this species on the basis of its dark coloration.

Measurements (in mm.).—Type: total length, 257; tail vertebrae, 145; hind foot, 41; ear from notch, 14. Skull: basal length, 25.2; length of nasals, 13.4; greatest breadth, 23.0; maxillary breadth, 20.0; interorbital breadth, 12.3; maxillary tooth row, 4.7.

The average and extreme measurements of 2 male and 2 female topotypes are, respectively: total length, 254.5 (252–257), 241.5 (240–243); tail vertebrae, 140 (135–145), 132.5 (132–133); hind foot, 40.5 (40–41), 38.5 (38–39); ear from notch, 14.5 (14–15), 14 (14–14). Skull: basal length, 25.2 (25.2–25.2), 25.15 (24.8–25.5); length of nasals, 13.5 (13.4–13.6), 12.95 (12.6–13.3); greatest breadth, 23.1 (23.0–23.2), 22.6 (22.0–23.2); maxillary breadth, 19.95 (19.9–20.0), 19.05 (18.6–19.5); interorbital breadth, 12.15 (12.0–12.3), 11.7 (11.6–11.8); maxillary tooth row 4.65 (4.6–4.7), 4.35 (4.2–4.5); diastema, 8.35 (8.3–8.4), 8.35 (8.3–8.4).

Description of pelage.—Color of type: General tone of upperparts near Olive-Brown mixed with blackish; cover hairs with subterminal band of Light Pinkish Cinnamon, tipped with black; Light Pinkish Cinnamon clearer on the sides; dorsal hair pure Slate-Gray at base; dorsal and ventral black stripes on tail wider than lateral white markings and extend to end of tail; soles of hind feet and heel blackish; remaining underparts white; anterior portion of white hip stripe narrow; extensive arietiform markings of face, skin and most of hair on posterior half of ears, black.

Comparisons.—From near topotypes of *columbianus*, this race differs in greater body length, slightly longer hind foot, and slightly shorter and wider skull. The interparietal bone is shorter, wider anteriorly and more nearly pointed posteriorly, resembling *celeripes* in this respect. Differs from *celeripes* in larger size, longer tail, and, on the average, shorter and narrower skull with greater interorbital width. Differs from *cupidineus* in shorter, narrower skull and shorter diastema. The interparietal bone is larger and less pointed posteriorly in *panguitchensis* than in Arizona and southern Utah specimens of *cupidineus*. Differs from *fetusus* in larger size, longer tail, slightly smaller foot, smaller skull with greater interorbital breadth, and narrower across bullae.

From the four above named races, *panguitchensis* differs in its much darker pelage, with vibrissae, arietiform markings, skin and hair of ears, and soles of feet all more nearly black. The white markings are less extensive throughout.

Specimens examined.—Four, all from the type locality.